CLAIMS

1. A medical apparatus inserted in a body cavity, comprising a body cavity inserting portion having a projected portion that is spiral-shaped for generating thrust in contact with the body cavity, wherein

the projected portion has the structure which satisfies at least one of five conditions including the pitch of 10 mm or more, the height of 0.3 mm or more and 3 mm or less, the cross-sectional shape that is substantially semi-circular or substantially trapezoidal, the inclining angle of an end portion of 45° or less, and the number of spirals that is 2 or more and 10 or less.

2. A medical apparatus inserted in a body cavity, comprising a body cavity inserting portion having a projected portion that is spiral-shaped for generating thrust in contact with the body cavity, wherein

the projected portion has the structure which satisfies at least two of five conditions including the pitch of 10 mm or more, the height of 0.3 mm or more and 3 mm or less, the cross-sectional shape that is substantially semi-circular or substantially trapezoidal, the inclining angle of an end portion of 45° or less, and the number of spirals that is 2 or more and 10 or less.

3. A medical apparatus according to Claim 1, wherein at

least one groove is formed along the spiral of the projected portion with the depth shallower than the height of the projected portion.

4. A medical apparatus according to Claim 1, wherein the projected portion smoothly rises up from the end portion thereof and has the peak in the center thereof.

5. A medical apparatus comprising a body cavity inserting portion having at least a magnet and a projected portion that is spiral-shaped for generating thrust so as to rotate and advance the body cavity inserting portion in a body cavity by receiving a rotating magnetic field,

wherein the projected portion has the structure which satisfies at least one of five conditions including the pitch of 10 mm or more, the height of 0.3 mm or more and 3 mm or less, the cross-sectional shape that is substantially semi-circular or substantially trapezoidal, the inclining angle of an end portion of 45° or less, and the number of spirals that is 2 or more and 10 or less.

6. A medical apparatus according to Claim 5, further comprising

a control device which controls the rotating velocity of the body cavity inserting portion to five rotations or less per second.

7. A medical apparatus according to Claim 5, further comprising

a control device which controls the magnetic torque for acting rotating magnetic field to the magnet to 0.06 cNm or more.

8. A medical apparatus according to Claim 5, further comprising

a control device which controls the magnetic torque for acting rotating magnetic field to the magnet to 1 cNm or less.

9. A medical apparatus comprising a body cavity inserting portion having at least a thrust generating unit and a magnet so as to rotate and advance the body cavity inserting portion in a body cavity by receiving a rotating magnetic field generated by a magnetic field generating device,

wherein a magnetic torque, as product of the rotating magnetic field generated by the magnetic field generating device and the magnetic moment generated by the body cavity inserting portion, is preset to 0.06 to 1 cNm.

10. A medical apparatus according to Claim 1, wherein the body cavity inserting portion is capsule-shaped for the medical action including examination such as observation, sensing, and sampling in a subject, curing, and treatment.

11. A medical apparatus according to Claim 5, wherein the body cavity inserting portion is capsule-shaped for the medical action including examination such as observation, sensing, and sampling in a sample, curing, and treatment.

12. A medical apparatus according to Claim 1, wherein the body cavity inserting portion comprises at least an optical device, an image pick-up device, and an illuminating device so as to pick up an image of the body cavity.

13. A medical apparatus according to Claim 1, wherein the body cavity inserting portion comprises at least a flexible string portion and a hard portion which can be swallowed from the mouth or can be inserted from the anus.

14. A medical apparatus according to Claim 1, wherein the body cavity inserting portion comprises a medicine storage portion for spreading a medicine.

15. A medical apparatus according to Claim 1, wherein the body cavity inserting portion comprises a solution storage portion.

16. A medical apparatus according to Claim 1, wherein the body cavity inserting portion comprises a storage portion of a treatment tool.

17. A medical apparatus according to Claim 16, wherein the treatment tool is a needle.

18. A medical apparatus according to Claim 1, wherein the body cavity inserting portion comprises a storage portion which can freely project a treatment tool.

19. A control program for moving a medical apparatus inserted in a body cavity having a magnet which is rotated by receiving a rotating magnetic field and a projected

portion which is spiral-shaped for generating thrust in contact with the body cavity, the control program comprising:

a magnetic field control step of controlling the rotating magnetic field so that the rotating velocity of medical apparatus is five rotations or less per second, or the magnetic torque acting on the magnet is not over 1 cNm.

20. A control program according to Claim 19, wherein the strength of magnetic field of the rotating magnetic field is controlled so that the magnetic torque acting on the magnet is 0.06 cNm or more.

ABSTRACT

A capsule medical apparatus inserted in the body cavity includes a spiral projected portion on the outer peripheral surface of a body cavity inserting portion. The pitch, height, and cross section of the projected portion and the like are set to have proper values and shapes suitable to the advance thereof. The body cavity inserting portion has a magnet. An external magnetic guiding device applies a rotating magnetic field to the magnet and the magnetic torque acts on a magnet 36 for rotation. Thus, the medical apparatus stably advances.